[redacted]

75

Panel Ribs

23 Mar. 1965

There are 11 ribs (Dwg. of 22 Mar)

~~h is the distance in the plane of transverse curvature from the 20' member to the panel at rib center~~

~~l = length of blank = W+2"~~

No	x' ft	WIDTH W ft	h^*	$\ell^\dagger$ (finish)	$\frac{.0417}{h}W$	$\frac{.2083}{h}W$				
$\boxed{1}$	10.2 2.0	1.175 75	4.5	1.342 16.10	.011	.054				
2	12.2 2.1	1.392 91	4.1	1.559 18.71	.014	.070				
3	14.3 2.1	1.614 111	3.7	1.781 21.37	.018	.091				
$\boxed{4}$	16.4 2.0	1.831 127	3.6	1.998 23.98	.021	.106	1.789	1.704	1.664	
5	18.4 2.0	2.033 142	3.5	2.200 26.40	.024	.121	1.988	1.891	1.866	
6	20.4 2.0	2.231 158	3.4	2.398 28.78	.027	.137	2.183	2.073	2.064	
$\boxed{7}$	22.4 2.5	2.425 165	3.5	2.592 31.10	.029	.144	2.375	2.260	2.258	
8	24.9 2.4	2.662 171	3.7	2.829 33.95	.030	.150	2.611	2.491	2.495	= 29.94"
9	27.3 2.4	2.885 175	3.9	3.052 36.62	.031	.154	2.833	2.710	2.718	32.62
10	29.7 1.3	3.102 172	4.3	3.269 39.23	.030	.151	3.051	2.930	2.935	35.22
11	31.0	3.218 170	4.5	3.385 40.62	.030	.149	3.167	3.048	3.051	36.61

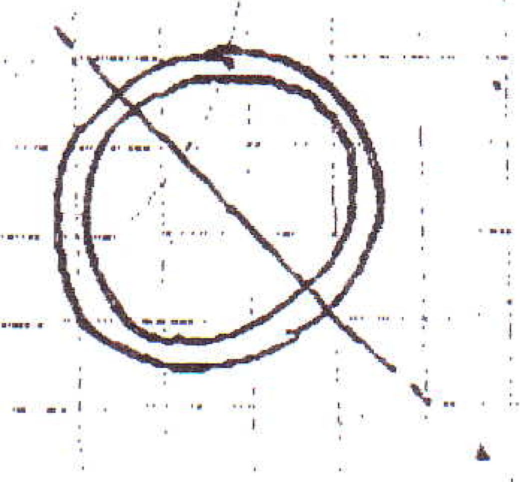
* h is the distance, in the plane of transverse curvature, from the 20' member to the panel at rib center

† l = length of blank = W + 0.167 (2" = 0.167 ft)

X	Y	$Z+\frac{1}{12}$
1.143	1.100	1.008
1.357	1.301	1.225
1.575	1.503	1.447

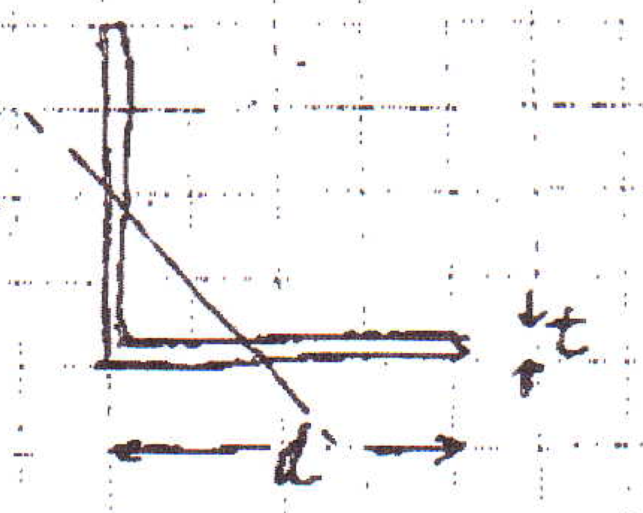
Angle versus tube

30 Mar 1965



~~area~~ $I_0 = \frac{1}{2}\pi D t_0 \cdot \frac{D^2}{4}$ $= \frac{\pi}{8} D^3 t$

r of gyr = $\frac{\frac{1}{2}D}{\sqrt{2}}$ = .7 radius



$I_L = 2 d t_L \cdot \left(\frac{d}{5\cancel{4}}\right)^2$ (thin section)

$= \frac{1}{12} d^3 t$

r. of gyr. = $\cancel{\frac{d}{4\sqrt{3}}}$ $\frac{d}{2\sqrt{6}}$

For equal material, $\pi D t_0 = 2 d t_L$

$$\frac{I_0}{I_L} = \frac{3\,\cancel{24}\,D^2 t_0}{d^2 t_L} = \frac{\overset{12}{\cancel{16}}}{\pi^2} = \cancel{1.6}\ 1.2$$

For equal weights, and t, tube has ~~1.6~~ 1.2 times more moment of inertia than angle.

Tube	Equivalent Angle	r. of gyr.
$1\frac{1}{4}''$ d.	2.5 x 2.5 ~~3.0 x 3.2~~	.44"
$1\frac{1}{4}''$ x .049	2.3 x 2.3 ~~2.0 x 2.0~~ x .063	

From tables

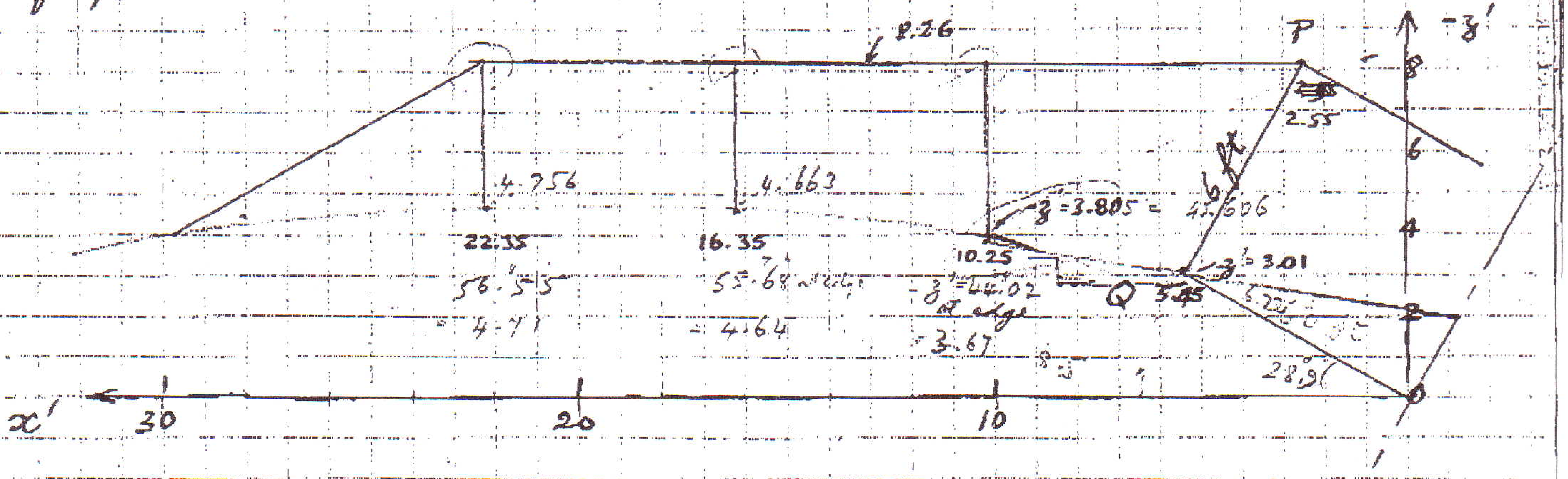
	r	area	I	Calc	
O $1\frac{1}{4}'' \times \frac{1}{16}''$	.42	.233	.041	area = $\pi \times 1\frac{1}{4} \times \frac{1}{16}$ = .24	gyr = $0.7 \times \frac{5}{8}$ = .44
L $2 \times 2 \times \frac{1}{16}$	.4	.25	.04	area = .24	gyr = 2/sq. = $\frac{.4}{.25}$

Tests (p. 91) show that 2 x 2 x .063 angle is too thin and fails before developing calculated strength. Thin walled tube $1\frac{1}{4}''$ dia. x .049 is OK however.

Fixing Spine Location

Ap 6 1965

From Dwg No RC-124 adopt $-z' = 8.26$ feet for location of spine.



Location of main ribs, from Dwg: $x' = 10.25,\ 16.35,\ 22.35$

To locate points P and Q: Assume $PQ = 6$ ft, angle is $28.9°$

Then

$$\left.\begin{aligned} -z'_Q + 6\cos 28.9 &= 8.26 \\ x'_Q &= -z'_Q \cot 28.9 \\ x'_P &= x'_Q - 6 \sin 28.9 \end{aligned}\right\} \quad \begin{aligned} -z'_Q &= 3.01 \\ x'_Q &= 5.45 \\ x'_P &= 2.55 \end{aligned}$$

The accuracy is about $\pm .01$ ft and depends on the 6 ft. dimension, which is still open to change. The 8.26 dimension is effectively frozen by this decision.

$6.22 \cos 28.9 = 5.45$